

CLAIM AMENDMENT

Applicants respectfully request that the Claims be amended to read as follows so as to place them in condition for allowance, or at least in better form for Appeal, pursuant to 37 CFR 1.116:

1. (Currently Amended) A signal line drive circuit provided with a reference voltage chooser circuit for choosing one of incoming voltages in accordance with tones represented by an image signal to output the chosen voltage as a signal line drive signal, comprising
a reference voltage line directly transmitting a multiple first reference voltage voltages supplied by external reference voltage supply means to the reference voltage chooser circuit.

2. (Currently Amended) A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage derived from multiple first reference voltages supplied to the signal line drive circuit from external reference voltage supply means to output a signal line drive signal, wherein:

a second reference voltage produced by voltage division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance; and

the first reference voltages are directly supplied to the reference voltage chooser circuit in which a voltage is chosen from input voltages and then output as a signal line drive signal in accordance with the tones represented by the image signal.

3. (Currently Amended) A signal line drive circuit provided with a reference voltage chooser circuit for choosing, in accordance with tones represented by an image signal, a voltage derived from multiple first reference voltages supplied to the signal line drive circuit from external reference voltage supply means to output a signal line drive signal, wherein:

a second reference voltage produced by voltage division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance;

among power supply voltages supplied to the signal line drive circuit, at least a power supply voltage supplied to the buffer circuit is supplied to the buffer circuit via a first switch controlled through a first control signal; and

the reference voltage chooser circuit chooses one of incoming voltages to output a signal line drive signal in accordance with the tones represented by the image signal.

4. (Original) The signal line drive circuit as defined in claim 3, wherein the first switch is controlled in accordance with the number of tones represented by the image signal.

5. (Currently Amended) A signal line drive circuit, provided with a voltage divider circuit for producing a second reference voltage by voltage division from at least two of first reference voltages supplied to the signal line drive circuit from external voltage supply means, the signal line drive circuit outputting a signal line drive signal in accordance with tones represented by an image signal, wherein

a second switch controlled through a second control signal is interposed between the first reference voltages and the voltage divider circuit.

6. (Original) The signal line drive circuit as defined in claim 5, wherein the second switch is controlled in accordance with the number of tones represented by the image signal.

7. (Currently Amended) A signal line drive circuit, comprising:
a sampling circuit for sampling an image signal so as to generate a sampling signal representative of the number of tones contained in said image signal;
a reference voltage chooser circuit for choosing a reference voltage in accordance with the ~~sampl~~ed sampling signal to output a signal line drive signal; and
a decoder circuit for controlling the reference voltage chooser circuit in accordance with the ~~sampl~~ed sampling signal ;

wherein:

the decoder circuit is controlled through a third control signal
to change a decoder table; according to a decoder
table determined by the number of tones represented
by the sampling signal; and
the reference voltage chooser circuit changes a reference voltage
choosing pattern in response to an output of the decoder circuit.

8. Canceled, without prejudice.

9. (Currently Amended) A signal line drive circuit including:
a sampling circuit for sampling an image signal;
a voltage divider circuit for producing a second reference
voltage by voltage division from at least two of multiple first
reference voltages from external voltage supply means supplied to
the signal line drive circuit; and
a reference voltage chooser circuit for choosing a voltage
derived from the first reference voltages to output a signal line
drive signal,
the second reference voltage being supplied to the reference
voltage chooser circuit via a buffer circuit having a high input
impedance and a low output impedance,

the reference voltage chooser circuit choosing one of
incoming voltages,
the signal line drive circuit including a decoder circuit for
controlling the reference voltage chooser circuit in accordance
with the sampled signal and outputting the signal line drive signal
in accordance with tones represented by the sampled signal,
said signal line drive circuit comprising at least any one of:

- (i) a first switch to cut off power supply to the buffer circuit;
- (ii) a second switch interposed between the first reference
voltages and the voltage divider circuit to cut off the reference
voltage supplied to the voltage divider circuit; and
- (iii) a decoder circuit for changing a decoder table to change
a pattern according to which the reference voltage chooser circuit
chooses a reference voltage,

wherein

at least any one of the first switch, the second switch, and
the decoder table for the decoder circuit is/are controlled for
closure/opening or changed in accordance with the number of
tones represented by the image signal.

10. (Previously Presented) A signal line drive circuit including:
- a sampling circuit for sampling an image signal;
 - a voltage divider circuit for producing a second reference voltage by voltage division from at least two of first reference voltages supplied to the signal line drive circuit; and
 - a reference voltage chooser circuit for choosing a voltage derived from the first reference voltages to output a signal line drive signal,
- the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance,
- the reference voltage chooser circuit choosing one of incoming voltages,
- the signal line drive circuit including a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal and outputting the signal line drive signal in accordance with tones represented by the sampled signal,
- said signal line drive circuit comprising:
- a first switch to cut off power supply to the buffer circuit;
 - a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and
 - a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage,

wherein

when the number of tones represented by the image signal is less than or equal to the number of the first reference voltages, the first switch and the second switch are both opened, and the decoder circuit switches the decoder table to one of the decoder tables that matches the number of tones represented by the image signal.

11. (Currently Amended) An image display device, comprising:

pixels arranged in a matrix form;

signal lines connected to the pixels;

scan lines connected to the pixels;

a scan signal line drive circuit for supplying scan

signals to the scan lines for a vertical scan; and

a signal line drive circuit for supplying signal line

drive signals to the signal lines, the signal line drive circuit

including a reference voltage chooser circuit for choosing,

in accordance with tones represented by an image signal, a

voltage derived from multiple incoming first reference

voltages from external reference voltage supply means to

output the chosen voltage,

wherein:

a second reference voltage produced by voltage

division from at least two of the first reference voltages is supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance; and

the first reference voltages are directly supplied to the

reference voltage chooser circuit in which a voltage is chosen from input voltages to output a signal line drive signal in accordance with the tones represented by the image signal.

12. (Original) A portable apparatus, comprising an image display device as defined in claim 11.

13. (Currently Amended) An image display device, comprising:

pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying scan
signals to the scan lines for a vertical scan; and
a signal line drive circuit for supplying signal line
drive signals to the signal lines, the signal line drive circuit
including a reference voltage chooser circuit for choosing,
in accordance with tones represented by an image signal, a
voltage derived from multiple incoming first reference
voltages from external reference voltage supply means to
output the chosen voltage,

wherein:

a second reference voltage produced by voltage
division from at least two of the first reference voltages is
supplied to the reference voltage chooser circuit via a buffer
circuit having a high input impedance and a low output
impedance;
among power supply voltages supplied to the signal
line drive circuit, at least a power supply voltage supplied
to the buffer circuit is supplied to the buffer circuit via a
first switch controlled through a first control signal; and
the reference voltage chooser circuit chooses one of
incoming voltages to output the signal line drive signal in
accordance with the tones represented by the image signal.

14. (Original) A portable apparatus, comprising an image display device as defined in claim 13.

15. (Currently Amended) An image display device, comprising:
pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
a signal line drive circuit for supplying signal line drive signals to the signal lines, the signal line drive circuit including: a voltage divider circuit for producing a second reference voltage by voltage division from ~~at least two of~~ incoming multiple first reference voltages from external reference voltage supply means; and a reference voltage chooser circuit for choosing an output in accordance with tones represented by an image signal,
wherein
a second switch controlled through a second control signal is interposed between the first reference voltages and the voltage divider circuit.

16. (Original) A portable apparatus, comprising an image display device as defined in claim 15.

17. (Currently Amended) An image display device, comprising:

pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying scan
signals to the scan lines for a vertical scan; and
a signal line drive circuit including: a sampling circuit
for sampling an image signal so as to generate a sampling
signal representative of the number of tones contained in
said image signal; a reference voltage chooser circuit for
choosing an output in accordance with tones represented
by an image the sampling signal; and a decoder circuit for
controlling the reference voltage chooser circuit in
accordance with the sampled sampling signal, the reference
voltage chooser circuit supplying signal line drive signals to
the signal lines,

wherein:

the decoder circuit is controlled through a third
control signal to change according to a decoder table
determined by the number of tones represented by the
sampling signal; and
the reference voltage chooser circuit changes a reference voltage
choosing pattern in response to an output of the decoder
circuit.

18. (Currently Amended) A portable apparatus, comprising an image display
device as defined in claim ~~16~~ 17.

19. (Original) An image display device, comprising:

pixels arranged in a matrix form;
signal lines connected to the pixels;
scan lines connected to the pixels;
a scan signal line drive circuit for supplying
scan signals to the scan lines for a vertical
scan; and

a signal line drive circuit including: a voltage

divider circuit for producing a second reference voltage by voltage division from ~~at least two of incoming multiple~~ first reference voltages supplied to the signal line drive circuit from external reference voltage supply means; a reference voltage chooser circuit for choosing a voltage in accordance with tones represented by an image signal to output the chosen voltage; a sampling circuit for sampling the image signal; and a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance, the reference voltage chooser circuit choosing one of incoming said multiple first reference voltages, the signal line drive circuit supplying signal line drive signals to the signal lines in accordance with tones represented by the image signal sampled by the sampling circuit,

said signal line drive circuit comprising at least any one of:

- (i) a first switch to cut off power supply to
the buffer circuit;
- (ii) a second switch interposed between the
first reference voltages and the voltage divider
circuit to cut off the reference voltage supplied
to the voltage divider circuit; and
- (iii) a decoder circuit for changing a decoder
table to change a pattern according to which
the reference voltage chooser circuit chooses a
reference voltage,

wherein

at least any one of the first switch, the second switch, and the
decoder table for the decoder circuit is/are controlled for
closure/opening or changed in accordance with the number of
tones represented by the image signal.

20. (Original) The image display device as defined in claim 19,

further comprising a setup circuit for controlling at least
any one of the first switch, the second switch, and the
decoder circuit in accordance with a change in the number
of tones represented by the image signal, so as to switch
between drive mode arbitrarily.

21. (Original) A portable apparatus, comprising an image display device as defined in claim 19.

22. (Previously Presented) An image display device including:

- pixels arranged in a matrix form;
- signal lines connected to the pixels;
- scan lines connected to the pixels;
- a scan signal line drive circuit for supplying scan signals to the scan lines for a vertical scan; and
- a signal line drive circuit including: a voltage divider circuit for producing a second reference voltage by voltage division from at least two of incoming first reference voltages; a reference voltage chooser circuit for choosing a voltage in accordance with tones represented by an image signal to output the chosen voltage; a sampling circuit for sampling the image signal; and a decoder circuit for controlling the reference voltage chooser circuit in accordance with the sampled signal, the second reference voltage being supplied to the reference voltage chooser circuit via a buffer circuit having a high input impedance and a low output impedance, the reference voltage chooser circuit choosing one of incoming voltages, the signal line drive circuit supplying signal line drive signals to the signal lines in accordance with tones represented by the image signal sampled by the sampling circuit,

said image display device comprising:

- a first switch to cut off power supply to the buffer circuit;
- a second switch interposed between the first reference voltages and the voltage divider circuit to cut off the reference voltage supplied to the voltage divider circuit; and
- a decoder circuit for changing a decoder table to change a pattern according to which the reference voltage chooser circuit chooses a reference voltage;

wherein

when the number of tones represented by the image signal is less than or equal to the number of the first reference voltages, the first switch and the second switch are both opened, and the decoder circuit switches the decoder table to one of the decoder tables that matches the number of tones represented by the image signal.

23. (Original) The image display device as defined in claim 22, further comprising a setup circuit for controlling at least any one of the first switch, the second switch, and the decoder circuit in accordance with a change in the number of tones represented by the image signal, so as to switch between drive mode arbitrarily.

24. (Original) A portable apparatus, comprising an image display device as defined in claim 22.